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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,320	12/14/2001	Scott Harris Bloom	AIRFIBE.012A	2263

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EXAMINER	
PAYNE, DAVID C	

ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/023,320	BLOOM, SCOTT HARRIS	
	Examiner	Art Unit	
	David C. Payne	2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 2 August 2005. These drawings are acceptable.

Response to Arguments

2. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 21-23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "near IR" in claim 21 is a relative term, which renders the claim indefinite. The term " near IR" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. One skilled in the art cannot ascertain the proper size of the diameter.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 7, 8, 9, 11, 14, 15, and 18, are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves et al. US 20020196506 A1 (Graves) in view of Islam US 6,356384 B1 (Islam).

Re claims 1, 8, 9, 11, and 18, Graves disclosed

A free-space optical data transmission system, comprised of first and second transceivers spaced a substantial distance from each other and having telescopes aimed at each other. Each transceiver has a light transmitter for transmitting data-encoded light from its telescope to the other telescope, and a light receiver for receiving the data-encoded light from the other telescope.

Each transceiver has a wavefront sensor for determining the curvature of the wavefront of light transmitted between the telescopes, which light wavefront may be distorted by atmospheric aberrations, a deformable curvature mirror operably connected to the wavefront sensor and positioned in the path of the data-encoded light for modifying the wavefront curvature of the data-encoded light in response to the wavefront curvature determined by the wavefront sensor, see paragraph 0003.

Each transmitter preferably is provided with a power driven mechanism for appropriately changing the direction in which the transceiver is aimed, such as by the tip-tilt, see Figs. 14A – 14E. Graves does not disclose a combination amplifier (w.r.t. claim 8, including at least a Raman amplifier) used to amplifier an optical signal.

Islam disclosed a combination amplifier using Erbium and Raman (Figure 1A) in a fiber optic system. It would have been obvious to one of ordinary skill in the art at the time of invention to use the Islam combination amplifier in the Graves invention in order to broaden amplification of the optical system from the 1430nm to 1620 nm range as disclosed, see Islam col./lines: 3/55-67.

Re claim 14

the modified invention of Graves and Islam disclosed

wherein said adaptive optics system comprises: an active optical element having an adjustable tip, tilt, and piston position, said amplified optical signal is reflected from said active optical element before transmission across said free space medium; and a control module operable to control said adjustable tip, tilt, and piston position of said active optical element based on an atmospheric figure, and receiver, see Graves Figure 6, paragraph 0041.

Re claim 7, the modified invention of Graves and Islam disclosed

a wavelength division multiplexing (WDM) module coupled to said fiber optic cable and configured to receive a plurality of data signals and multiplex all of said plurality of data signals into said optical signal wherein each of said plurality of signals is transmitted at a different wavelength, see paragraph 0028. It is well understood that DWDM is a mere scaling of wavelengths to a WDM system and therefore non-obvious over the prior art.

Re claim 15, the modified invention of Graves and Islam disclosed wherein said active optical element is one or more of the following: microelectro-mechanical systems, liquid crystal arrays, piezo electric mirrors, and deformable mirrors, see paragraph 0003.

5. Claim 2-6, 19 and 20 are is rejected under 35 U.S.C. 103(a) as being unpatentable over Graves et al. US 20020196506 A1 (Graves) in view of Islam US 6,356384 B1 (Islam) as applied to claims 1, 8, 11, and 18 above, in further view of Akkapeddi US 4949056 A (Akkapeddi).

Re claims 2, 19 and 20

The modified invention of Graves and Islam does not disclose modifying phase before amplification. Akkapeddi employs a Raman where signal after passing through the atmosphere, the signal is phase-conjugated and amplified in a Raman amplifier, resulting in a high energy laser beam with phase-

conjugated aberrations which is returned to the satellite by a telescope, see col. Lines: 1/65-67, 2/1-5. It would have been obvious to one of ordinary skill in the art at the time of invention to employ the Raman amplifier in the Graves system to correct for perturbations in the atmosphere which create phase aberrations in the transmitted signal, see Akkapeddi col./lines: 1/10-25.

Re claims 3-6

the modified invention of Graves and Akkapeddi disclosed

wherein said adaptive optics system comprises: an active optical element having an adjustable tip, tilt, and piston position, said amplified optical signal is reflected from said active optical element before transmission across said free space medium; and a control module operable to control said adjustable tip, tilt, and piston position of said active optical element based on an atmospheric figure, and receiver, see Figure 6, paragraph 0041.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graves et al. US 20020196506 A1 (Graves) and Islam US 6,356384 B1 (Islam) as applied to claim 9 above, and in further view of Fukuchi US 20020064340 A1 (Fukuchi).

   Re claim 9 and 10, the modified invention of Graves and Islam does not disclose a semiconductor amplifier. Fukuchi disclosed such amplifiers used to magnify the gain of fiber optic system, see paragraph 0116. It would have been obvious to one of ordinary skill in the art at the time of invention to employ the Fukuchi amplifiers in the modified invention since these are common amplifiers that exhibit superior properties in fiber optic transmission systems.

7. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves et al. US 20020196506 A1 (Graves) and Islam US 6,356384 B1 (Islam) as applied to claim 11 above, and in further view of Day US 6266464 B1 (Day).

   Re claim 12 and 13 (as understood based on the 112 rejection),

   the modified invention of Graves and Akkapeddi does not disclose an adiabatic taper apparatus

coupled to said receiver and configured to reduce the diameter of said attenuated optical signal. Day disclosed the use of an adiabatic taper, see Day col./lines 11/24-30. It would have been obvious to one of ordinary skill in the art at the time of invention to employ the adiabatic tapers in the modified invention since it is well known that the power lost through the taper side-walls decreases for increasing taper lengths, becoming effectively loss-less or "adiabatic" for large lengths.

8. Claims 21, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves et al. US 20020196506 A1 (Graves) in view of Islam US 6,356384 B1 (Islam) and Myrick et al. US 6198531 B1 (Myrick).

   Graves and Islam disclosed the modified invention but does not disclose using orthogonal wavelengths. Myrick disclose using orthogonal wavelengths, see col./lines: 16/10-25. it would have been obvious to one of ordinary skill in the art at the time of invention to use orthogonal wavelengths in the Graves and Islam invention so as increase wavelength capacity of the system.

9. Claim 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves et al. US 20020196506 A1 (Graves) in view of Islam US 6,356384 B1 (Islam) and Myrick et al. US 6198531 B1 (Myrick) as applied to claim 21 above, and in further view of Akkapeddi US 4949056 A (Akkapeddi).

   Re claim 22

   The modified invention of Graves, Islam and Myrick does not disclose modifying phase before amplification.

   Akkapeddi employs a Raman where signal after passing through the atmosphere, the signal is phase-conjugated and amplified in a Raman amplifier, resulting in a high energy laser beam with phase-conjugated aberrations which is returned to the satellite by a telescope, see col. Lines: 1/65-67, 2/1-5. It would have been obvious to one of ordinary skill in the art at the time of invention to employ the Raman amplifier in the modified system to correct for perturbations in the atmosphere which create phase aberrations in the transmitted signal, see Akkapeddi col./lines: 1/10-25.

Re claim 23

the modified invention of Graves and Islam disclosed

wherein said adaptive optics system comprises: an active optical element having an adjustable tip, tilt, and piston position, said amplified optical signal is reflected from said active optical element before transmission across said free space medium; and a control module operable to control said adjustable tip, tilt, and piston position of said active optical element based on an atmospheric figure, and receiver, see Graves Figure 6, paragraph 0041.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Payne whose telephone number is (571) 272-3024. The examiner can normally be reached on M-F, 7a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dcp

David C. Payne
Patent Examiner
AU 2638